

**DEPARTMENT OF  
VETERANS AFFAIRS**

**VISN 1**



**ENVIRONMENTAL ASSESSMENT  
Contract VA776-P-0018  
OF THE PROPERTY LOCATED AT**

**Togus VAMC  
1 VA Center  
Augusta, Maine**

**October 28, 2009  
Revised November 20, 2009**

**Presented by:**

**ONIX, Inc.  
238 Shafer Road  
Coraopolis, PA 15108**

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## **EXECUTIVE SUMMARY**

The Environmental Assessment (EA) implementing the provision of the NEPA (National Environmental Policy Act) was conducted for the property described as the Togus VA Medical Center, located at 1 VA Center in Augusta, Maine. The site inspection took place on October 15, 2009 and was conducted by Mr. Keith Brown representing ONIX, Inc.

The assessment followed the guidelines and Scope of Work provided to ONIX, Inc. No assumptions were made in conducting the assessment. The Environmental Assessment was conducted according to National Environmental Policy Act, Title 40 CFR Parts 1500 – 1508; and VA Regulations, Environmental Effects of VA Actions, Title 38 CFR, Part 26 (51 FR 37182, October 20, 1986). This Environmental Assessment (EA) is not to be confused with a Phase I Environmental Assessment or any assessment requiring environmental media sampling and analysis.

The Togus VAMC property is a medical center for veterans. It is a 67-operating bed facility with general medical, surgical, intermediate and mental health bed, as well as a 100-bed Nursing Home consisting of 50 Skilled and Longer Stay bed, and a 50-bed Dementia Unit. The facility was opened in 1866. The property encompasses 476+ acres of land with buildings, natural woodlands, and a national cemetery.

The proposed project is to design and install a Biomass boiler which will be fueled by wood chip and wood waste to provide heat to the facility. There is also an option to install additional equipment in combination with the biomass boiler, which includes an absorption chiller, steam chiller, and an electric cogeneration system. In addition, a variety of fuel types were also evaluated as other options instead of wood chips. These fuel sources include landfill methane gas and natural gas. These systems are designed to provide a potentially economical viable option for the energy demands of the facility. The Biomass Boiler will be installed in the vicinity of the current boiler plant. The Environmental Assessment will focus primarily on the impacts of the biomass boiler installation as the proposed project. The additional equipment that can be installed in conjunction with the biomass boiler will have minimal overall impacts.

The findings of the Environmental Assessment have determined that the proposed project will not have a significant impact on the human environment and an environmental impact statement is not required to be prepared.

## **I EXISTING CONDITIONS**

The property is identified as Togus VA Medical Center, located at 1 VA Center in Augusta, Maine. It is a 67-operating bed facility with general medical, surgical, intermediate and mental health, as well as a 100-bed Nursing Home consisting of 50 Skilled and Longer Stay bed, and a 50-bed Dementia Unit.

The property is a multifaceted medical facility providing services for veterans of the United States Armed Forces. The facility also contains two national veteran's cemeteries. Further, the facility is equipped with engineering and logistical support services for property maintenance and upgrades.

The building that is the subject of this evaluation is Building #238, the boiler plant. It is located on the northwestern side of the center of the site. The building has a footprint area of approximately 4,850 square feet. Other features of this building include a smokestack for the boilers and two above ground fuel storage tanks, one for No. 2 fuel oil and the other for No. 6 fuel oil. The boiler plant oriented with its long dimension running east to west. The east end of the building is currently a relatively large, open space used for maintenance and some storage. The boilers are located in the center and west end of the building.

Other buildings on the property include the main hospital building which is approximately fifteen buildings all interconnected by a corridor system. Individually these buildings are labeled beginning at the northerly end of the property: #200E, #209, #200, #210, #235, #203, #240, #204, #248, #205, #206, #207, #221, and #232.

Additional support buildings on the property include a vehicle maintenance shop, several maintenance shops, a chiller plant, residential structures, a wood-framed barn, a decommissioned wastewater treatment plant and an electric entrance building.

The Togus property covers approximately 476 acres. It is at a rural location approximately five miles east of downtown Augusta, Maine. Most of the property is physically located in the township of Chelsea, Maine.

Most of the property consists of natural groundcover – grasslands, wetlands, and mixed growth hardwood forest. Paved areas, including roads and parking are primarily bituminous concrete. Non-paved developed areas are generally maintained turf.

The wastewater treatment facility is located approximately 0.58 miles south southeast of the project site. It is a mechanical plant consisting of an oxidation ditch, two clarifiers and sludge preparation equipment. It has been decommissioned and is in the process of being demolished.

A site map is included as Appendix B

Adjacent properties are primarily residential in nature, with a few homes and businesses along route 17, north of the property.

## **II PURPOSE AND NEED FOR PROJECT**

The proposed project is to design and install a Biomass boiler which will be fueled by wood chip and wood waste to provide heat to the facility. There is also an option to install additional equipment in combination with the biomass boiler, which includes an absorption chiller, steam chiller, and an electric cogeneration system. In addition, a variety of fuel types were also evaluated as other options instead of wood chips. These fuel sources include landfill methane gas and natural gas. These systems are designed to provide a potentially economical viable option for the energy demands of the facility. In addition, these systems utilize a sustainable fuel source which is economical and vastly available in this part of the country.

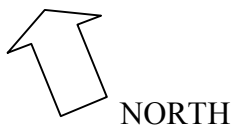
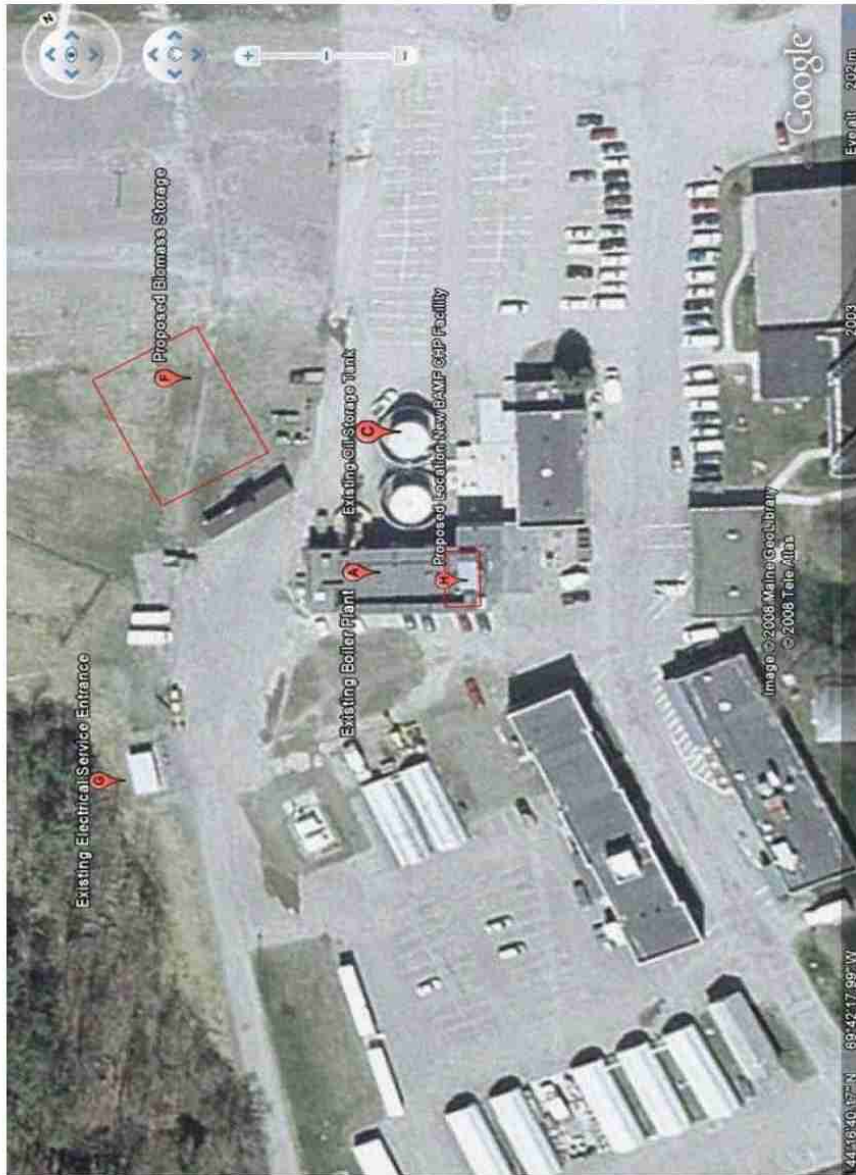
The proposed location of the biomass boiler system is at the boiler plant. The east end is the location of a former solid waste incinerator that has been removed. The proposed biomass storage area is to the west of the boiler plant.

Ground surfaces adjacent to the boiler plant are paved. Surface water tends to flow over pavement to a low area approximately ten feet west of the west end of the building where a catch basin is located. The ground surface generally slopes downward from east to west, and is generally level from the west end of the building to the westerly edge of the pavement.

The proposed biomass storage area is currently a dirt surface used as a soil stockpile area. The wood chips will likely be stored in a storage bin with overhead doors for a floating bed tractor trailer to provide delivery.

The equipment proposed to be installed in this project is subject to state and federal air emission regulations, and therefore the equipment will be installed with emission control technologies to meet the established regulations which will limit the impact on the environment from its operation. As part of the design process, the location of the equipment, setback from property lines and buildings, as well as aesthetics and noise will be evaluated to limit the impact on the surrounding areas.

VAMC Togus Aerial View from 202m



### **III PROJECT ALTERNATIVES**

A feasibility study was conducted to analyze the economical benefits of various options of alternative methods to provide heat, cooling, and electricity to the facility.

The options include:

- Biomass boiler only
- Biomass boiler and absorption chiller
- Biomass boiler, steam chiller & electric generator
- Landfill gas boiler only
- Natural gas boiler only
- Alternative methane gas turbine
- Natural gas turbine

The addition of the chiller to the system would require the installation of a new cooling tower, which would increase water consumption and wastewater. The addition of the cogeneration system would increase overall emissions from the system since the overall operation would increase. The use of natural gas would require the construction of a gas pipeline from the existing gas line approximately 11 miles away in addition to a line from VAMC boundary to the boiler. This would involve running underground lines, which can be expensive and would require design and planning.

The use of landfill methane gas would require the construction of a gas pipeline from the landfill, located approximately 3 miles from the facility. Technical challenges include removal of pollutants entrained in the fuel prior to combustion.

Based on the economical and feasibility of available fuel options, it was recommended that the biomass boiler, steam chiller and electric generator was the best option based on net savings and simple payback. The biomass boiler could be fueled with wood chips. The possibility of having the biomass boiler fueled by landfill gas is dependant upon the availability.

### **IV REGULATION RELATED TO PROJECT**

The Environmental Protection Agency (EPA) Clean Air Act.

The Department of Environmental Protection (DEP), State of Maine.

The Maine DEP has adopted air pollution control regulations that establish limitations on emissions from numerous sources, including biomass boilers and cogeneration systems. The

emission limitations are dependant upon the manufacture date of the equipment, the size, fuel type and operating parameters. There are also setback limitations and stack height requirements for the biomass boiler. New regulations were recently adopted to lower the limit of particulate emissions from wood fired boilers to 0.32 lb/mmbtu. Any new equipment installed will have to meet this lower emission limit, which will likely require installing emission control technologies.

The EPA has adopted New Source Performance Standards (NSPS) which dictates specific limitations on the emissions from cogeneration systems and biomass boilers. To meet these emission rates, specific control technologies, monitoring devices, and reporting requirements are necessary.

The Best Available Control Technology (BACT) is required for a cogeneration system and biomass boiler in order to meet the current emission standards. The Maine DEP will require submission of a top down BACT analysis to be submitted along with the permit modification application.

The Maine DEP actively regulates and enforces the NSPS and BACT standards established by the EPA and incorporates these standards in their regulations. Emission testing will likely be required to establish that the installed equipment is meeting the emission limitations. Air Permits for the operation of the new equipment will be required.

It was confirmed that local construction permits would not be required for the installation of this system, building construction or modifications to buildings. However, soil erosion plan and a storm water permit is normally required for any construction activities.

The next step of proceeding with the planned project is to complete a preliminary design, construction plan, and site plan. The design should include the selected equipment type, equipment manufacturer, type and performance of the control technology, and the manufacturer's air emission rates.

The permitting process with the DEP would be – 1) select equipment, size, type, manufacturer, etc. 2) contact the manufacturer for specific information on the operation, emission control options, and their actual emission rates from this equipment, 3) The VA will hire a contractor to perform the top down BACT analysis and to complete the permit modification application for submission to the DEP, 4) the DEP will review and approve the BACT analysis and permit.

Once the design is prepared, then the process of obtaining the appropriate permits can begin.

Local – For local building permits



City of Augusta, Maine  
Code Enforcement  
City Center Plaza  
16 Cony Street  
Augusta, Maine, 04330  
207-626-2300  
<http://www.ci.augusta.me.us/code.html>

State – To obtain Air Permit for project  
Maine Department of Environmental Protection  
Bureau of Air Quality  
17 State House Station  
Augusta, Maine 04333  
207-287-2437  
<http://www.maine.gov/dep/air/programs.htm>

## **V     AFFECTED ENVIRONMENT / ENVIRONMENTAL CONSEQUENCES**

### **a.     Soil/Geology**

The soil survey completed for Kennebec County was reviewed. There is a variety of soil types across the subject property. They include Biddeford mucky peat (Bo), Buxton silt loam 3-8% and 8-15% slopes eroded (BuB2) (BuC2), Hollis fine sandy loam 3-8% and 8-15% slopes (HrB) (HrC), Paxton-Charlton very stony fine sandy loams 3-8%, 8-15%, and 15-30% slopes (PeB) (PeC) (PeD), Ridgebury very stony fine sandy loam (RdA), Scantic silt loam (ScA), Togus fibrous peat (TO), and Woodbridge fine sandy loam 3-8% slopes (WrB).

The underlying bedrock in the area beneath the subject property is from the Paleozoic era from the Devonian and Silurian period. It is described as sandstone and slate with some volcanic rocks.

Some soil excavation may be required for construction activities associated with the project but the impact should be minimal. A soil erosion plan is normally required for any construction activities.

### **b.     Hydrology / Wild and Scenic Rivers**

There are two small ponds on the property (one acre or less in size), one is north of Building #209 and the other is generally east of Building #209. The north pond level is controlled by a dam structure, and is part of Greeley Brook. The easterly pond is

connected to the Greeley Brook via overflow pipes, as it is known on site, which is also known as Chase Brook on the Town of Chelsea tax maps. This stream flows generally north to south along the easterly edge of the developed portion of the property. Stormwater drainage on the property is by sheet flow over surfaces to catch basins that direct water to an underground storm water drainage system, which is reported to discharge to Greeley Brook. There are no storm water retention basins on the property.

The ponds and stream are located on the north and eastern sides of the property and the location of the biomass boiler and storage area are located on the western side of the property. Therefore, the environmental impact from the proposed project should not affect the onsite water bodies.

c. Wetlands

According to the U.S. Department of the Interior Wetlands survey, there are wetlands on the site, most of which appear to be generally east of the developed area (see attached map in Appendix B). They are primarily freshwater forested shrub wetlands and freshwater emergent wetlands.

The proposed project is located in a developed area of the property, adjacent to the boiler plant on the western section of the site, which does not have wetlands identified. Therefore, the environmental impact from the proposed project should not affect any wetland areas.

d. Floodplains

The developed portion of this property is generally flat to gently rolling. There is a ridge along the northwest boundary upon which the West Cemetery is located. Drainage on site generally is from north to south.

According to the Federal Emergency Management Agency (FEMA) flood zone map, Community Panel 2302340002B, dated June 15, 1994, the subject property is located in Zone X, outside the 500-year floodplain.

Based on the topography of site, the potential of flooding is minimal. The proposed project should not have an impact on the floodplains area.

e. Vegetation

Vegetation on site appears to consist mostly of native grasses and mixed hardwoods.

Native evergreen and deciduous trees were observed in woodland areas.

Depending on the exact location of the wood storage building, some of the grass area adjacent to boiler plant could be eliminated. The proposed project should not have a significant impact on the vegetation.

f. Endangered Species / Wildlife

According to the Federal Land Use database, no threatened, endangered, or candidate species' and/or habitats are located on the subject property or within a one-mile radius of the subject property.

However the Federal Land Use database does report a few species in the county. They are identified as the fish Atlantic salmon endangered, the bird bald eagle threatened, and the plant small whorled pogonia threatened.

None were observed, and none were reported within vicinity of site by site contacts.

Since there are no endangered species on the subject property, the environmental impact from the proposed project should not affect any endangered species. There is a potential for transient species to locate to the property, but the project should not have an affect on these.

g. Unique Farmland

There is no tilled farmland on the property. Sludge from the wastewater treatment facility was land-spread over several meadows, all located east of Greeley Brook. VA Togus contracts with a local farmer to cut hay off the land spread areas. However, VA Center Togus is now connected to the Greater Augusta Area Utilities District wastewater collection and treatment system, and the on-site wastewater treatment plant that generated the land spread material is in the process of being shut down, with demolition of the facility planned for the near future. The last land-spread application is scheduled for mid to late November 2009.

Since the subject property is not identified as unique farmland, the environmental impact from the proposed project should not affect any unique farmland.

h. State or National Park

There are no state or national parks on the property. Togus National Cemetery is located on site, in two sections, east and west. The east cemetery is approximately 0.37 miles east of the project site, and the west cemetery is approximately 0.22 miles

west of the project site.

Since there are no state or national parks located on the subject property, the environmental impact from the proposed project should not affect any state or national parks.

Since the location of the project is not in the vicinity of either cemetery, the environmental impact from the proposed project should not affect them.

i. Natural Resources

The natural resources evaluated include timber, soils, minerals, fish, wildlife, water bodies, and aquifers. The subject property is currently developed with multiple buildings, paved roads and parking, and areas of vegetation.

Construction of the system in the proposed project is ultimately dependent on the final design, however there is a potential for building modification, subsurface excavation, and surface grading. There are no surface water bodies or wildlife on the subject property that would be affected. There are minimal natural resources located on the subject property, therefore the environmental impact to them from the proposed project would also be minimal.

j. Aesthetics

The project involves installing new equipment. Depending on the exact size, type and location of the equipment, aesthetics should be taken into consideration. The equipment will likely be installed inside the existing boiler plant or in a newly constructed building. If the biomass boiler is installed, it will require a storage location for the wood chips. It is likely that a storage bin or other similar type building would be constructed to house the wood chips.

If the building locations and design are similar to the existing, aesthetics should not be significantly impacted by the proposed project.

k. Noise

The project involves installing new equipment. Depending on the exact size, type and location of the equipment, noise should be taken into consideration. The equipment will likely be installed inside the existing boiler plant or in a newly constructed building, which will limit the noise impact to the surrounding buildings.

If the equipment is installed inside a building, the noise impact should be minimal. If the equipment is installed on an existing building roof or outside, the noise impact will be greater. Noise from the equipment can be minimized and engineered to pose the least impact to staff and patients. Neighbors are sufficiently distant that with correct muffling, there should be minimal impact to the surrounding areas. There will be some noise with truck traffic including delivery and unloading of wood chips and disposal of the ash waste. Since there will be a storage building for the wood chips, the truck deliveries will be reduced. For a hospital of this size, we would estimate that normal truck activity to the site would be 20 trucks per day to the loading dock area. The amount of wood chip delivery trucks will vary depending on the size and storage capacity of the storage bin; however it would likely average an increase the truck traffic with one to two additional trucks per day. Removal of the ash from the biomass boiler would be estimated at a one to two additional trucks per week.

Noise limits are determined based on the township regulations, local zoning, distance of source to property line, and hours of operation. The International Building Code 2006 has noise limitations at property boundaries of 65 dBA from 7am-10pm and 50dBA from 10pm-7am. The hospital may have imposed its own noise restrictions based on daily hours or vicinity to sensitive areas of the hospital. Operational procedures can be established to minimize the noise impact from the equipment operation and truck deliveries. Therefore, this project should have minimal environmental impact on noise.

#### I. Historical Significance

There is one building on the site currently listed in the National Register of Historic Places. This is known as “Quarters One” It is a single family residence located approximately 0.02 miles northeast of the project site.

Personnel interviewed at the time of the inspection indicated that there has been some discussion on-site about further investigation of the possibility of additional buildings on this site also being named to the National Register of Historic Places.

There are historical sites identified in areas around the subject property. The exact distance from the subject property was not available. The historical sites identified are listed below.

- Capitol Complex Historic District, State & Capital Streets, Augusta
- Crosby Street Historic District, Crosby St. & Crosby Lane, , Augusta
- Cushnoc, Augusta
- John Davis House, ME 9, Augusta

- Governor's House (Quarters One), off ME 17, Augusta
- Powers House, South of Sidney on ME 104, Augusta
- Winthrop Street Historic District, 20 Spring St, Augusta
- Powder House lot, High St., Augusta

Some of the structures located on the subject property are architectural historic assets, and therefore this should be taken into consideration if any existing structures are to be modified to accommodate the equipment in the proposed project. The environmental impact of the proposed project should not affect the historical structures located in the surrounding areas.

m. Native American Sacred Sites

There are no American Indian Sacred Sites located on or surrounding the subject property.

The environmental impact from the proposed project should not affect any Native American sacred sites.

n. Minority and Low-Income Populations

There is a hospital located at the subject property, identified as the Veterans Affairs Medical Center. This facility provides medical, surgical, rehabilitative, and social support services. There are no minority or low-income populations residing at the subject property.

Even though there is a potential for minority and low-income populations to reside in the surrounding areas, the proposed project should have minimal to no impacts of their use and consumption of environmental resources.

o. Utilities

Utilities on site include the following:

- Electricity – provided by Central Maine Power Company. There are two entrances, one known as the Chelsea Feed and the other as the Augusta Feed.
- Sewer, Water – provided by Greater Augusta Utilities District.
- Cooling – A chiller plant for the main hospital building and numerous window mounted air conditioning units. Air cooled chillers are in buildings 206 & 207

- Medical wastes are removed from site under contract by Stericycle
- Heating – No. 2 & No. 6 fuel oil boilers
- Emergency power generation – diesel fuel
- Dental lab, boiler pilot ignition, heat for two modular buildings – propane

There are no water supply wells on the campus. We observed no evidence of water supply wells in the vicinity of the boiler building.

The proposed project is to install biomass boiler and cogeneration system. The boilers will provide heat to the facility and the cogeneration system will provide electric power. These will supplement and/or replace the existing sources. The project will impact the utilities by changing the source of heat and/or power.

p. Solid Waste

Solid waste is removed from the site by a facility owned solid waste truck. It is hauled to the Augusta landfill. For hospitals of this size, we would estimate a one to three 40 yard dumpsters are removed from the site every two days.

Ash is a byproduct of the biomass boiler, which will have to be properly disposed of in accordance with the local and State Environmental Regulations. The normal ash production would be estimated to be 10% of the amount of wood chips burned. This would likely increase the waste removal only by one to two dumpsters per week. The environmental impact from the proposed project should not significantly affect the solid waste.

q. Aviation/Radar

The property is not located within a flight path, and there are no obstructions that affect domestic aeronautical charting.

The environmental impact from the proposed project should not affect any aviation, radar or towers.

r. Environmental Permits

The property currently makes use of environmental permits for air emissions for the boiler plant and also land application of waste sludge.

There are no underground storage tanks on site; the last was reportedly removed in 1995.

There are two, 275-gallon above ground storage tanks on site, one located between Quonset huts to the east of the boiler room approximately 0.07 miles south of the project, and the other adjacent to the chiller plant located to the northwest of the boiler plant approximately 0.11 miles north northwest of the project.

Inventory of all aboveground tanks on the property are as follows:

- 75,000 gallon #2 Fuel Oil (boiler plant)
- 75,000 gallon #6 Fuel Oil (boiler plant)
- 4,000 gallon gasoline (vehicle fueling station)
- 4,000 gallon diesel (vehicle fueling station)
- 2,000 gallon diesel (B200 emergency generator)
- 50 gallon diesel (B200 emergency generator day tank)
- 275 gallon diesel (B200 fire pump)
- 500 gallon diesel (B249 emergency generator)
- 500 gallon diesel (B244 emergency generator)
- 275 gallon diesel (B238 emergency generator)
- 275 gallon K-1 (heat)
- (8) 275 gallon #2 fuel tanks (located in quarters).

According to the database report, a number of spills were reported on the subject property between 1995-2005. They were all small spills that were cleaned up in accordance with the state regulations.

## **VI ENVIRONMENTAL CONSEQUENCES OF NO ACTION ALTERNATIVE**

The no action alternative would be to maintain the operation of the existing boilers, which operate with No. 6 and No. 2 fuel oil and continue to purchase electricity from the local utility company.

The environmental consequences of the no action alternative would be the following:

- Continued use of fuel oil, which has future increased cost and availability limitations. This is also not a sustainable fuel source.
- Operation of older boilers, which do not have the new emission control technologies installed.
- Utilizing electricity from the local utility company continues the use of the fossil fuels that they use to generate the power.



- Generating power on-site can provide the facility with its own sustainable resource. This reduces the overall demand from the local utility company, especially during peak demand times of the day and year.

## VII **CUMULATIVE IMPACTS**

Federal and State environmental regulations require permits for operation, emission monitoring and testing, emission control technologies, recordkeeping and reporting requirements, and operation and maintenance requirements.

Impacts from the project include activities associated with the construction and installation, proper operation and maintenance of the equipment, new control technologies, adequate training of the staff, installation of wood storage building, waste disposal of ash, and modification of connections to existing utilities.

**TABLE A - Estimated fuel usage comparison**

<b>Description</b>	<b>Fuel oil consumption</b>	<b>Wood Chip consumption</b>	<b>Ash produced</b>	<b>Electric Usage</b>
	(gallons/yr)	(tons/yr)	(ton/yr)	(kwh/yr)
Existing Boilers operating #6 oil	860,000	0	0	12,710,400
Biomass boiler wood chips	172,000	11,837	1,184	12,710,400
Biomass boiler & absorption chiller	172,000	12,736	1,274	12,341,611
Biomass boiler, steam chiller & electric generator	172,000	15,798	1,580	10,729,224

Note: Reference quantities in Biomass Feasibility report summary table, ash produced based on 10% estimate, assume fuel oil may still be used to supplement biomass boiler system by 20%

**TABLE B -Estimated Emissions in tons/yr**

<b>Description</b>	<b>CO</b>	<b>NO<sub>x</sub></b>	<b>SO<sub>x</sub></b>	<b>TSP**</b>	<b>VOC</b>	<b>PM-10</b>
Existing Boilers operating on #6 oil*	2.15	23.65	33.76	4.30	0.49	4.30
Biomass boiler wood chips	12.07	13.28	1.51	19.32	1.21	15.09
Biomass boiler & absorption chiller	12.99	14.29	1.62	20.79	1.30	16.24
Biomass boiler, steam chiller & electric generator	16.11	17.73	2.01	25.79	1.61	20.14

Note: Biomass boiler calculations based on published emission rates used in the Biomass Feasibility report and estimated wood chip consumption

\*Calculations based on actual annual fuel consumption and EPA AP-42 emission factors

\*\*TSP based on EPA Phase 2 emission limit for particulates of 0.32 lb/mmbtu for biomass boilers

**TABLE C – Estimated Green house gas emissions**

<b>Description</b>	<b>Fuel Oil Consumption (gal/yr)</b>	<b>CO<sub>2</sub> Oil (tons/yr)</b>	<b>Wood Chip Consumption (tons/yr)</b>	<b>CO<sub>2</sub> Wood (tons/yr)</b>	<b>Total CO<sub>2</sub> (tons/yr)</b>
Existing Boilers operating on #6 oil*	860,000	10,750	0	0	10,750
Biomass boiler wood chips	172,000	2,150	11,837	18,927	21,077
Biomass boiler & absorption chiller	172,000	2,150	12,736	20,365	22,515
Biomass boiler, steam chiller & electric generator	172,000	2,150	15,798	25,261	27,411

\*Calculations based on actual annual fuel consumption and EPA AP-42 emission factors

Replacement of fuel oil with biomass fuel generated steam will result in a significant increase in CO<sub>2</sub> emissions. However, please note in considering this increase the comment in **AP -42 Emission Factors, 1.6 Wood Residue Combustion in Boilers** 1.6.3.2 Green house Gases, pertaining to emissions from wood combustion (underline added for emphasis):

“Carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) emissions are all produced during wood residue combustion. Nearly all of the fuel carbon (99 percent) in wood residue is converted to CO<sub>2</sub> during the combustion process. This conversion is relatively independent of firing configuration. Although the formation of CO acts to reduce CO<sub>2</sub> emissions, the amount of CO produced is insignificant compared to the amount of CO<sub>2</sub> produced. The majority of the fuel carbon not converted to CO<sub>2</sub>, due to incomplete combustion, is entrained in the bottom ash. CO<sub>2</sub> emitted from this source is generally not counted as greenhouse gas emissions because it is considered part of the short -term CO<sub>2</sub> cycle of the biosphere.”

Estimated emissions from the installation of the biomass boiler would decrease NO<sub>x</sub> and SO<sub>2</sub>, but will likely increase CO, VOC, and particulates. However, the facility would remain below the threshold limits of being a major source. It should be noted that AP-42 factors are industry estimated emission rates and not necessarily the actual emissions from the existing boilers. Depending on the emission control technologies, these estimated emissions have the potential to be lower.

## **VIII CONCLUSION**

Based on the available information, the proposed project will not have a significant effect on the human environment and therefore an environmental impact statement is not required to be prepared.

## **IX PERSONS PERFORMING THE ASSESSMENT**

Keith R. Brown, P.E., ONIX, Inc.

Tricia L. Romano, P.E., LEED AP, ONIX, Inc.

Robert N. Roop, P.E., CBIE, ONIX, Inc.

## **X SOURCES CONTACTED**

Robert G. Kennedy, P.E., CEM, Energy Manager, Togus/WRJ/Manchester VAMC

Robert Hadsell, Utilities Manager, Togus VAMC

Pat Gagne, Maintenance Foreman, Togus VAMC

According to the site representative, a notice of the proposed project was published in the local newspaper. To date there have been no “interested parties” identified that have expressed interest in the project.

## **XI GLOSSARY OF TERMS**

Cogeneration – the simultaneous production of three useful energy streams such as electricity, steam and chilled water from a single energy input.

Biomass Boiler – A boiler fueled by carbon-based organic matter, which is available on a renewable basis. Common forms of biomass include forest and mill residue, agricultural crops and waste, wood and wood waste, fast-growing trees and plants, and industrial waste.

The federal, state and local environmental databases that were reviewed are included in Appendix C. There is a glossary of the databases and sources included in this appendix.

## **XII LIMITATIONS & RESTRICTIONS**

1. The purpose of this Report was to evaluate the potentially affected environments associated with the property and surrounding properties and the potential environmental impacts of the proposed project. No attempt was made to determine the compliance of present or former owner or occupants of the property with Federal, State or local environmental or land use laws and regulations except as noted in this Report.
2. This report focuses exclusively on the impacts of the proposed project on the environment. It does not address feasibility of the project, social, economic, or political impacts.
3. The information herein has been obtained from ONIX, Inc.’s property inspection, review of public records, available databases and maps, and review of the proposed project description. ONIX, Inc. does not guarantee the completeness or accuracy of such information.
4. The information provided in this EA is in part based on *visual* evidence available during a diligent site walk of the entire property and on inspection of all accessible areas within and

around the structure. This assessment is limited in nature and should not be inferred to be a guarantee with regard to the presence or absence of any known or unknown hazardous materials on the site.

5. We inspected all of the exterior portions of the property. We do not render an opinion on uninspected portions of the facility. We did not inspect the following areas:
  - The majority of the property was inspected from a vehicle on access roads and in parking area
  - Interior of all of the buildings, with the exception of the boiler building
6. This Environmental Assessment Report has been prepared for the exclusive use of the **Department of Veterans Affairs**. The work has been undertaken and performed in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made. It is our understanding and intention that the contents of this report be used to assess the potential environmental concerns associated with the property and structure located at **1 VA Center, Augusta, Maine**.
7. The information, observations, and conclusions described in this report are valid on the date of the investigation and have been made under the terms, conditions, limitations, and constraints noted in the report. We prepared the report for the exclusive use of **Department of Veterans Affairs**. No other individual or party shall be entitled to rely upon the report without our express written consent. If another individual or party relies on the report, such individual or party shall indemnify and hold ONIX, Inc. harmless for any damages, losses, or expenses incurred as a result of such use. Any use or reliance of the report by an individual or party other than **Department of Veterans Affairs** shall constitute acceptance of these terms and conditions. Any electronic copies of this report that are provided to **Department of Veterans Affairs** are for the convenience of **Department of Veterans Affairs** and are not to be construed as the original or final report. The work has been undertaken and performed in accordance with generally accepted engineering practices. No other warranty, expressed or implied, is made.

THIS REPORT IS DATED THIS 28th DAY OF OCTOBER 2009 AND IS SIGNED BY  
INDIVIDUALS WHO ARE DULY AUTHORIZED TO DO SO.

Report prepared under the direct supervision of and approved



By: \_\_\_\_\_

Robert N. Roop, P.E.

Investigation performed and report prepared



By: \_\_\_\_\_

Tricia L. Romano, P.E.,

## **APPENDIX A**

### **REFERENCES AND INFORMATION SOURCES**

InfoMap Technologies Inc., Environmental FirstSearch Report

Flood Insurance Rate Map (FIRM) –Community Panel 2302340002B, dated June 15, 1994

Wetlands Map – US Dept of the Interior, Fish & Wildlife Service

Geologic Map of Maine

USDA, NRCS, Soil Survey Map of Kennebec County, Maine

Biomass and CHP Assessment, prepared by ONIX, Inc., dated January 12, 2009

The Environmental Protection Agency (EPA) Clean Air Act Regulations

The Maine Department of Environmental Protection (DEP) Bureau of Air Quality

## **APPENDIX B**

### **Figures**



## **APPENDIX C**

### **Environmental FirstSearch Database Report**

## **APPENDIX D**

### **Qualifications and Resumes**

## ROBERT N. ROOP, P.E., B.I.E.

Comprehensive investigations of site, mechanical, electrical, structural, roofing, life safety systems and environmental conditions of property and buildings including homes. Investigations include environmental assessments and indoor air quality evaluations. Building condition assessments, facility inspections, forensic investigations, and HVAC design. Design of heating/cooling systems and utility distribution networks for hospitals and conduct Life Safety Code compliance inspections for their accreditation. Comprehensive environmental investigations and remediation at former industrial sites to allow their use for residential development. Planned and directed the worker health and safety program for remediation of a hazardous waste site to allow construction of a regional concert facility. Conducted applied research and product development in water and waste water disinfection. Developed several state of the art chemical feed and analytical instruments widely used in public water supply systems. Holds several United States patents in water disinfection equipment.

Licensed professional engineer in New Jersey, Pennsylvania, Delaware, New York, Connecticut, and Massachusetts. Trained and certified at the supervisory level for work at hazardous materials sites. Bachelor of Science in Mechanical Engineering from Tufts University and a Master of Science in Environmental Engineering from Villanova University. Member of the National Society of Professional Engineers, currently president of the Bucks County chapter. Active member of the American Society for Healthcare Engineering, National Academy of Building Inspection Engineers, National Fire Protection Association, American Society of Heating, Refrigeration, and Air Conditioning Engineers, and a member of several other organizations important in the inspection and design of buildings and their systems.

4/01-present, ONIX, Inc. team, Responsible for environmental operations, investigations, and design for residential, commercial, and institutional clients.

11/87 – 4/01, GHR CONSULTING SERVICES, INC., Horsham, PA, Vice President and President Responsible for day to day operations, planning, marketing, and technical content all investigations and designs. Instituted comprehensive quality assurance and health and safety programs. Expanded environmental site investigation services to include building condition assessments and preparation of Statement of Conditions with Plan for Improvement for healthcare clients

8/86 – 10/87, HUNTERDON POWER DEVELOPMENT, Lambertville, NJ, Consultant, Calculation of heat and electric process loads to determine potential for economic application of cogeneration to large energy consumers.

11/85 – 7/86, PRINCETON COMBUSTION RESEARCH LABORATORIES, INC., Princeton, NJ, Sr. Development Engineer, In principal charge of process and mechanical design of combustion research facilities; design of high pressure gas storage, flow measuring, and distribution system to ASME code including compression/expansion, thermal effects, combustion calculations, etc.

11/80 – 8/85, RESEARCH COTTRELL, INC., Somerville, NJ, Manager, New Business Development, Provide senior management with technical and economic evaluation of new process technologies for acquisition, license, etc.; Product Marketing Manager, Flue Gas Desulphurization & Fabric Filtration, Responsible for product/process development applications and marketing of dry and wet flue gas desulphurization and fabric filter products line.

10/72 – 10/80, FISCHER & PORTER COMPANY, Warminster, PA, Sr. Business Manager, Environmental Products, Technical and management responsibility for Product Research & Development activities as well as for marketing of those products; Manager, Environmental Instrumentation Development, In principal charge with technical and management responsibility for engineering staff of 24 conducting research and product development; Development Engineer, Sr. Development Engineer, Mechanical design of instruments and chemical feed equipment.

3/70 – 4/72, METAL MANUFACTURERS LTD., Port Kembla, NSW, Australia, Project Engineer, Several project assignments in capital equipment design, selection, installation and startup including installation of first exotic alloy wire manufacturing plant in southern hemisphere.

6/69 – 3/70, UNITED STATES STEEL CORPORATION, Fairless Hills, PA, Engineering Management Trainee, Technical supervision of mechanical trades and crafts in maintenance of steel mill utility system.

**PROFESSIONAL CERTIFICATION:** Professional Engineer registration in NJ, PA, MA, CT, NY, DE; NJDEP Radon Measurement Technician; 40 Hour Hazardous Waste Training, OSHA Standard 1910.120; New Jersey Certification: Underground Storage Tanks – All; Delaware Certification: Underground Storage Tanks; Building Inspection Engineers Certification Institute

**PROFESSIONAL AFFILIATIONS:** National Society of Professional Engineers; National Academy of Building Inspection Engineers; Healthcare Facility Management Society of New Jersey– Advocacy Chairman; Healthcare Facility Managers Association of Delaware Valley– Advocacy Chairman; American Society for Healthcare Engineering; American Society of Heating, Refrigeration and Air Conditioning Engineers; National Fire Protection Association; The National Council of Examiners for Engineering and Surveying; American Society of Mechanical Engineers

## **PROFESSIONAL QUALIFICATIONS AND EXPERIENCE**

**TRICIA L. ROMANO, P.E., LEED A.P.**

### **Area of expertise**

Ms. Romano is responsible for conducting engineering investigations. Investigations include home inspections, commercial property condition assessments, new construction building inspections and environmental assessments. These inspections include the evaluation of the structure, mechanical and electrical systems of buildings. She also provides analysis of site conditions and recommendations of design improvements.

### **Qualifications**

Ms. Romano has 10 years of engineering experience specializing in evaluation, inspection, and analysis of building condition assessments and environmental investigations. She has performed third party construction inspections on single -family houses and mid-rise condominiums. With the ability to identify construction deficiencies and recommend corrections, she has worked in conjunction construction managers to implement quality construction practices. She has evaluated the condition of the various systems in buildings, prepared maintenance plans and cost estimates for repairs, and provided recommendations for improvements.

She has conducted regulatory compliance evaluations of various commercial and industrial facilities to provide professional consulting to the facilities to ensure they abide with the complex environmental regulations. She has experience in the design, installation, operation, maintenance, and system performance evaluation of remediation and mechanical systems. She has performed indoor air quality analysis and risk assessments related to groundwater investigations and building safety. Previously, she had multiple responsibilities including health and safety officer assuring a safe work environment for personnel, field supervisor of construction and remediation activities, and technician maintaining optimal efficiency and calibration of field and laboratory equipment.

### **Education, Certification, & Affiliations**

Licensed Professional Engineer in New Jersey and Pennsylvania  
NJ Licensed Home Inspector  
LEED Accredited Professional  
Bachelor of Science in Engineering from Hofstra University  
40 Hour Hazardous Waste Training, OSHA Standard 29 CFR 1910.120  
Certified Radon Measurement Technician in New Jersey  
National Society of Professional Engineers, Bucks County Secretary